INSTRUCTION MANUAL

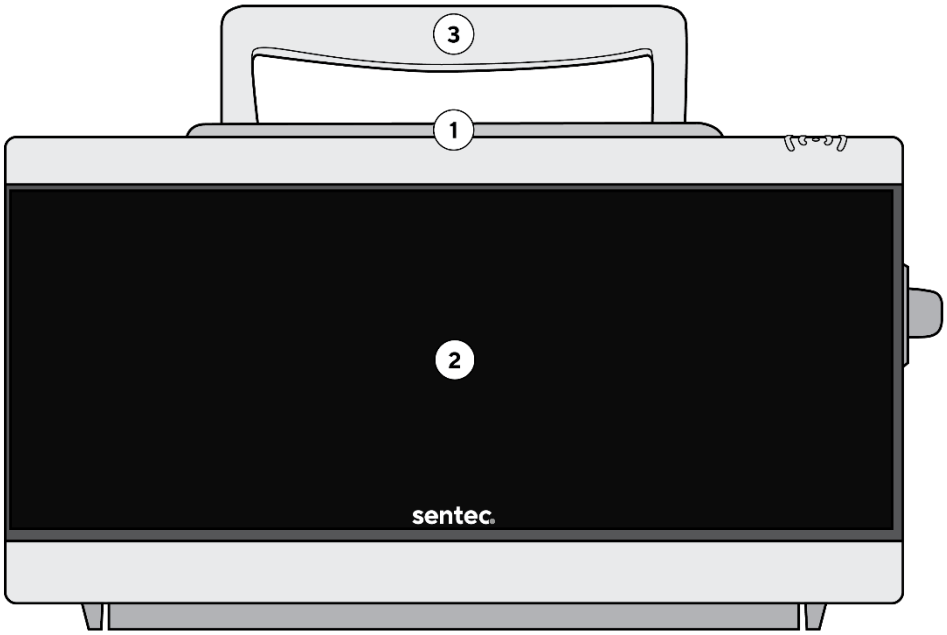
tCOM+ Transcutaneous Monitor & Sensors

SW-Version 1.0

sentec.

The tCOM+

Front panel



1 LED Bar
2 Touchscreen (go to page iii for details)
3 Handle

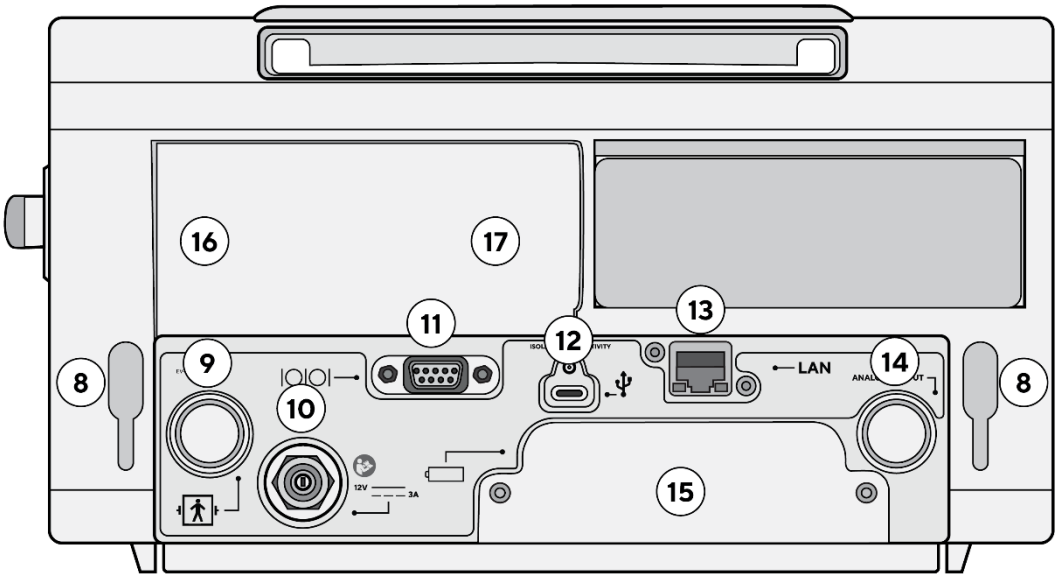
Side panel – left

4 Gas Bottle
5 DATA/SERVICE USB Port (USB C)
6 ON/OFF Button

Side panel – right

7 Docking Station

Back panel



8 Cable Holder Slots
9 Sensor Connection Port
10 DC Power Connector
11 Serial Data Port (RS-232)
12 Isolated Connectivity Port (USB C)
13 Network Port (LAN)
14 Analog Output Port
15 Battery Cover
16 Fan
17 Speaker

Touchscreen

The tCOM+ touchscreen allows user interaction via fingertip/thumb movement, such as tapping icons, words and symbols, e.g., to bring up or exit screens and to select or toggle options. Swiping gestures can be used for moving screens or setting parameters. Furthermore, a pop-up keyboard allows for entering customized information.

The touchscreen comprises the following sections:

1 Status Bar
2 Alarm Bar
3 Main Screen displaying Main Menu and/or Measurement Screen

All icons used on the tCOM+ touchscreen, except those depicted in the Status Bar, bear a name and/or description.

Note: Refer to 13.6 for a full list of user interface icons.

Warranty

The manufacturer warrants to the initial purchaser that each new tCOM+ will be free from defects in workmanship and materials. The manufacturer's sole obligation under this warranty is to at its own choice repair or replace any monitor – for which the manufacturer acknowledges the warranty cover – with a replacement monitor.

Warranty Exclusions and System Performance

Sentec AG can neither guarantee or verify instrument performance characteristics nor accept warranty claims or product liability claims if the recommended procedures are not carried out, if the product has been subject to misuse, neglect or accident, if the product has been damaged by extraneous causes, if accessories other than those recommended by Sentec AG are used, if the warranty seal on the lower side of the monitor is broken, or if instrument repairs are not carried out by Sentec authorized service personnel.

Unauthorized modifications to Sentec products could void your warranty and alter the regulatory status of the devices. Any resulting service required is not covered under our service agreements. Such modifications can affect the performance or safety of your device in unpredictable ways, and Sentec is not responsible for equipment that has been modified.

- **CAUTION:** Federal law (U.S.) restricts this device to sale by or on the order of a physician.

Patents/Trademarks/Copyright

International Industrial Design No. DM/054179, Japanese Design No. 1137696, U.S. Design Patent No. D483488.
Canadian Patent No. 2466105, European Patent No. 1335666, German Patent No. 50111822.5-08, Spanish Patent No. 2278818, Hong Kong Patent No. HK1059553, U.S. Patent No. 6760610.
Chinese Patent No. ZL02829715.6, European Patent No. 1535055, German Patent No. 50213115.2, Spanish Patent No. 2316584, Indian Patent No. 201300, Japanese Patent No. 4344691, U.S. Patent No. 7862698.

Sentec AG, Ringstrasse 39, 4106 Therwil, Switzerland, www.sentec.com

MEDICAL – GENERAL MEDICAL EQUIPMENT
AS TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY
IN ACCORDANCE WITH:

- ANSI/AAMI ES60601-1:2005/A2:2021
- CAN/CSA-C22.2 No. 60601-1:08, CAN/CSA-C22.2 No. 60601-1:14 (including amendment 1) and Amendment 2:2022 (MOD) to CAN/CSA-C22.2 No. 60601-1:14
- CAN/CSA-C22.2 No. 60601-1-6:11 (IEC 60601-1-6:2010+A1:2013+A2:2020, MOD)
- IEC 60601-1-6:2010+AMD1:2013+AMD2:2020
- CAN/CSA-C22.2 No. 60601-1-8:08, (IEC 60601-1-8:2006+A1:2012+A2:2020, MOD)
- IEC 60601-1-8:2006+AMD1:2012+AMD2:2020
- ANSI/AAMI HA60601-1-11:2015 &A1:2021
- CAN/CSA-C22.2 No. 60601-1-11:15, (IEC 60601-1-11:2015+A1:2020, MOD)
- IEC 60601-2-23:2011
- CSA CAN/CSA-C22.2 NO. 60601-2-23:12
- ISO 80601-2-61:2017
- CSA C22.2 No. 80601-2-61:21, (ISO 80601-2-61:2017, MOD)

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1 The Sentec Digital Monitoring System (SDMS / System)

1.1 Intended Purpose

The Sentec Digital Monitoring System (SDMS) – consisting of monitors, sensors, cables, accessories and disposables for sensor application/maintenance and PC-based software – is indicated for non-invasive patient monitoring of oxygenation and ventilation.

Note: This manual uses the term **"system"** to refer to any combination of the tCOM+ and sensors, cables, accessories, disposables, and software.

The Sentec Digital Monitoring System is for prescription use only. Devices are non-sterile and non-invasive.

The monitor is not in direct contact with the patient during monitoring. The V-Sign™ Sensor 2, the OxiVenT™ Sensor, the Ear Clip, the Multi-Site Attachment Rings, the Staysite™ Adhesive and the Contact Gel are in contact with the intact skin of the patient during monitoring.

Intended patient population: $tcPCO_2$ and $tcPO_2$ monitoring is indicated in adult/pediatric (older than term birth plus 12 months) and neonatal (younger than term birth plus 12 months) patients. Pulse oximetry monitoring is indicated in adult/pediatric patients only.

The target user population of the Sentec Digital Monitoring System is professional medical personnel, e.g. nurses, physicians, and – if under clinical supervision – lay operators. The correct and safe application of $tcPCO_2$ and $tcPO_2$ measuring equipment requires training of the user (e.g. physiological restrictions, technical aspects such as membrane change, meaning of drift, calibration). Home care providers also require specific training to be allowed to install the SDMS in home environments and to instruct lay persons how to apply the sensors correctly. The lay operator cannot modify the tCOM+ configuration by means of its menu.

Training: Professional medical personnel and instructed home care personnel are trained by Sentec or a qualified and authorized distributor. The instructed home care personnel provide the lay user with the lay user manual and explains attachment and detachment of the sensor. The instructed home care personnel also define the application site for the attachment of the sensor.

Environment of use: In clinical and non-clinical settings such as hospitals, hospital-type facilities, intra-hospital transport environments, clinics, physician offices, ambulatory surgery centers and – if under clinical supervision – home environments. Hospital use typically covers areas such as general care floors, operating rooms, special procedure areas, intensive and critical care areas. Hospital type facilities typically cover facilities such as surgical centers, special nursing facilities and sleep labs outside of the

hospital. Intra-hospital transport includes transport of a patient within the hospital or hospital-type facilities.
The SDMS fulfils the requirements of a non-transit operable and portable device to be used in home environments.

Intended Purpose of the tCOM+:
The tCOM+ is a portable stand-alone patient monitor indicated for continuous, non-invasive patient monitoring of carbon dioxide partial pressure (PCO_2), oxygen partial pressure (PO_2), functional oxygen saturation (SpO_2) and pulse rate (PR), using either

- a single, digital sensor (V-Sign™ Sensor2) for PCO_2, SpO_2 and PR measurement, OR
- a single, digital sensor (OxiVenT™ Sensor) for PCO_2, PO_2, SpO_2 and PR measurement

PO_2 measurement with tCOM+ is only possible when used in combination with an OxiVenT™ Sensor.

Description tCOM+:

Patient monitor

REF:

103164

Note: For a list of components including their specific intended purpose, contraindications, useful/shelf life, environmental and storage conditions, please refer to Appendix 13.2.

1.2 Clinical Benefits

Transcutaneous blood gas monitoring can support improved clinical management of patients:

- Compared to intermittent arterial blood gas analysis, transcutaneous blood gas monitoring can be performed continuously, helping clinicians to identify trends and assess patient status.
- Non-invasive patient monitoring can help reduce the frequency of blood draws, thereby supporting reduction of the associated risks such as iatrogenic blood loss, infection, and pain.
- Performance of transcutaneous monitoring of PCO_2 and PO_2 monitoring is independent of ventilation strategy and lung compromise.
- Transcutaneous PCO_2 monitoring is possible in inpatient, outpatient, or home care settings.

1.3 Transcutaneous PCO_2 and PO_2

1.3.1 Principles of Operations of $tcPCO_2$ and $tcPO_2$

Carbon dioxide (CO_2) and Oxygen (O_2) are gases that readily diffuse through body and skin tissue and, therefore, can be measured by an appropriate non-invasive sensor being applied at the skin surface. If the skin tissue beneath the sensor site is warmed up to a constant temperature, local capillary blood flow increases, metabolism stabilizes, gas diffusion improves and, hence, reproducibility and accuracy of CO_2/O_2 measurements at the skin surface improves.

CO_2 tensions measured at the skin surface ($PcCO_2$) are usually consistently higher than arterial PCO_2 values ($PaCO_2$) in patients of all ages. It is therefore possible to estimate $PaCO_2$ from the measured $PcCO_2$. $TcPCO_2$ designates an estimate of $PaCO_2$ calculated from the measured $PcCO_2$ with an algorithm developed by J.W. Severinghaus. The 'Severinghaus Equation' first corrects $PcCO_2$ measured at the sensor temperature (T) to 37 °C by using an anaerobic temperature factor (A) and then subtracts an estimate of the local 'Metabolic Offset' (M).

Note: The $tcPCO_2$ values displayed by the tCOM+ are corrected/normalized to 37 °C and provide an estimate of $PaCO_2$ at 37 °C. On the tCOM+ and throughout this manual (unless explicitly stated otherwise) '$tcPCO_2$' is displayed/labelled as 'PCO_2'.

In newborns, PO_2 measured at the skin surface (PcO_2) correlates with arterial PO_2 (PaO_2) almost in a one-to-one relationship at a sensor temperature of 43 to 44 °C. The accuracy of PcO_2 compared to PaO_2 is best up to a PaO_2 of 80 mmHg (10.67 kPa), above which it increasingly tends to read lower than PaO_2 (especially in adults). As target PaO_2 levels in newborns are usually below 90 mmHg (12 kPa), a correction of PcO_2 values measured at a sensor temperature of 43 to 44 °C is normally not necessary.

Note: $TcPO_2$ designates an estimate of PaO_2 and corresponds to the measured PcO_2. On the tCOM+ and throughout this manual (unless explicitly stated otherwise), '$tcPO_2$' is displayed/labeled as 'PO_2'.

The recommended (and default) 'Sensor Temperature' and 'Site Time' for Sentec Transcutaneous Sensors depend on the selected patient type and the enabled parameters as summarized in the following table:

Patient Type	**PO_2 enabled**	**Recommended Sensor Temperature [°C]**	**Recommended Site Time [h]**
Neonate (if younger than term birth + 12 months)	No	41.0	8.0
	Yes	43.0	2.0
Adult/ Pediatric	No	42.0	8.0
	Yes	44.0	2.0

Good to know!
Warming the skin tissue beneath the sensor to a constant temperature improves accuracy because it a) increases capillary blood flow/induces local arterialization, b) stabilizes metabolism, and c) improves gas diffusion through skin tissue. With increasing sensor temperature, the application duration ('Site Time') must be evaluated carefully and adjusted accordingly to reduce the risk of burns. Special attention must be given to patients with sensitive skin at the sensor site (3.2).

1.3.2 Limitations of tcPCO_2 and tcPO_2

The following clinical situations or factors may limit the correlation between transcutaneous and arterial blood gas tensions:

- Hypo-perfused skin tissue beneath the sensor site due to low cardiac index, circulatory centralization (shock), hypothermia (e.g., during surgery), use of vasoactive drugs, arterial occlusive diseases, mechanical pressure exercised on measurement site, or inadequate (too low) sensor temperature.
- Arterio-venous shunts, e.g., ductus arteriosus (PO_2 only).
- Hyperoxemia (PaO_2 > 100 mmHg (13.3 kPa)) (PO_2 only).
- Inadequate measurement site (placement over large superficial veins, on areas with skin edema (e.g., oedema neonatorum), skin breakdown, and other skin anomalies).
- Improper sensor application resulting in an inadequate, not hermetically sealed contact between the sensor surface and the patient's skin causing the CO_2 and O_2 gases diffusing out of the skin to intermix with ambient air.
- Exposure of the sensor to high ambient light levels (PO_2 only).

- **WARNING:** The tCOM+ is not intended for usage during diathermy/electro-surgery. It is recommended to remove the sensor from the patient during treatment with such devices. Sensor and cables are to be physically separated from the electro-surgical equipment. The sensor must not be placed between cutting and counter electrode.
- **CAUTION:** Compared to the corresponding arterial blood gases, PCO_2 readings are typically too high and PO_2 readings typically too low if the measurement site is hypo perfused.
- **CAUTION:** The SDMS is not a blood gas device. Keep the above-mentioned limitations in mind when interpreting PCO_2 and PO_2 values displayed by the tCOM+.

When comparing PCO_2/PO_2 values displayed by the tCOM+ with $PaCO_2$/PaO_2 values obtained from arterial blood gas (ABG) analysis, pay attention to the following points:

- Carefully draw and handle blood samples.
- Blood sampling should be performed in steady state conditions.
- The $PaCO_2$/PaO_2 value obtained from ABG analysis should be compared to the monitor's PCO_2/PO_2 reading at the time of blood sampling.
- In patients with functional shunts, the sensor application site and the arterial sampling site should be on the same side of the shunt.
- If the menu-parameter 'Severinghaus Correction Mode' is set to 'Auto', the PCO_2 values displayed by the tCOM+ are automatically corrected to 37 °C (regardless of the patient's core temperature). When performing the ABG analysis,

be sure to properly enter the patient's core temperature into the blood gas analyzer. Use the blood gas analyzer's '37 °C-$PaCO_2$' value to compare with the monitor's PCO_2 value.
    - Verify proper operation of the blood gas analyzer. Periodically compare the blood gas analyzer's barometric pressure against a known calibrated reference barometer.

- **WARNING:** On patients in a compromised hemodynamic state, PCO_2/PO_2 measurements may be inaccurate.
- **WARNING:** To avoid inaccurate calibration, knowledge of the correct barometric pressure is important. Monthly check the barometer reading of the monitor against a known calibrated reference barometer, or another Sentec monitor (tCOM+, SDM) (4.1).
- **WARNING:** The Sentec Digital Monitoring System (SDMS) is to be operated by qualified personnel only. Read this manual, accessory Directions for Use, all precautionary information, and specifications before use.
- **WARNING:** The Sentec Monitors are not intended for diagnosis; they are intended only as an adjunct in patient assessment. They must be used in conjunction with clinical signs and symptoms. The Sentec monitors are transcutaneous blood gas analyzers.
- **WARNING:** Do not use tCOM+ monitors, sensors, cables, or connectors that appear damaged.
- **WARNING:** The SDMS can only be used in patients undergoing hyperbaric therapy if the monitor remains outside the hyperbaric environment.

1.4 Pulse Oximetry

1.4.1 Principles of Operations of Pulse Oximetry

The SDMS uses pulse oximetry to measure functional oxygen saturation (SpO_2) and pulse rate (PR). Pulse oximetry is based on two principles: firstly, oxyhemoglobin and deoxyhemoglobin differ in their absorption of red and infrared light (spectrophotometry) and secondly, the volume of arterial blood in tissue (and hence, light absorption by that blood) changes during the pulse (plethysmography).

Pulse oximeter sensors pass red and infrared light into a pulsating arteriolar vascular bed and measure changes in light absorption during the pulsatile cycle. Red and infrared low-voltage light-emitting diodes (LED) serve as light sources and a photodiode serves as photodetector. The software of a pulse oximeter uses the ratio of absorbed red to infrared light to calculate SpO_2.

Pulse oximeters use the pulsatile nature of arterial blood flow to differentiate the oxygen saturation of hemoglobin in arterial blood from the one in venous blood or tissue. During systole, a new pulse of arterial blood enters the vascular bed: blood volume and light absorption increase. During diastole, blood volume and light absorption decrease. By focusing on the pulsatile light signals, effects of nonpulsatile absorbers such as tissue, bone and venous blood are eliminated.

Note: The SDMS measures and displays functional oxygen saturation: the amount of oxygenated expressed as a percentage of the hemoglobin that can transport oxygen. The SDMS does not measure fractional saturation: oxygenated hemoglobin expressed as a percentage of all hemoglobin, including dysfunctional hemoglobins such as carboxyhemoglobin or methemoglobin.

Good to know!
Oxygen saturation measurement techniques – including pulse oximetry – are not able to detect hyperoxemia.

Due to the S-shape of the oxyhemoglobin dissociation curve (ODC), SpO_2 alone cannot reliably detect hypoventilation in patients administered with supplemental oxygen.

1.4.2 Limitations of Pulse Oximetry

The following clinical situations or factors may limit the correlation between functional oxygen saturation (SpO_2) and arterial oxygen saturation (SaO_2) or may cause the loss of the pulse signal:

- dysfunctional hemoglobin s (COHb, MetHb)
- anemia
- intravascular dyes, such as indocyanine green or methylene blue
- low perfusion at the measurement site (e.g., caused by inflated blood pressure cuff, severe hypotension, vasoconstriction in response to hypothermia, medication, or a spell of Rynaud's syndrome)
- venous pulsations (e.g., due to use of the forehead, cheek, or earlobe as a measurement site on a patient in steep Trendelenburg position)
- certain cardiovascular pathologies
- skin pigmentation, tattoos
- externally applied coloring agents (e.g., dye, pigmented cream)
- prolonged and/or excessive patient movement
- exposure of the sensor to high ambient light levels
- defibrillation

1.5 Sentec Transcutaneous Sensors

Sentec Transcutaneous (TC) Sensors (V-Sign™ Sensor 2, OxiVenT™ Sensor) provide superior performance, are robust, reliable and require comparatively low maintenance. They combine within a patented digital sensor design the optical components needed for 2-wavelength, reflectance pulse oximetry with the components needed to measure PCO_2 and – when using OxiVenT™ Sensors – PO_2.

Note: Throughout this manual, the term 'Sentec TC Sensor' refers to Sentec sensors providing transcutaneous blood gas measurements (i.e., V-Sign™ Sensor 2 and OxiVenT™ Sensor).

PO_2 (OxiVenT™ Sensor) is measured with dynamic fluorescence quenching, an oxygen sensing technology measuring the oxygen molecules present in the vicinity of a fluorescent dye being immobilized in a thin carrying layer incorporated within the sensor surface.

The PCO_2 measurement of Sentec TC Sensors is based on a Stow-Severinghaus type PCO_2 sensor, i.e., a thin electrolyte layer is confined to the sensor surface with a hydrophobic, CO_2 and O_2 permeable membrane. Membrane and electrolyte must be exchanged approximately every 28 days. Additionally, the sensor membrane must be changed if it is damaged, not properly seated, or if there is trapped air or dry electrolyte under the membrane. With Sentec's patented Membrane Changer, the membrane and electrolyte can be changed with the ease of 4 identical Press-and-Turn steps in a highly reproducible manner (3.12).

Calibration of the PCO_2 segment of Sentec TC Sensors is recommended every 6 to 12 hours and mandatory every 12 to 16 hours. The PO_2 measurement of the OxiVenT™ Sensor is virtually drift free and, hence, calibration free. Nevertheless, the tCOM+, as a precaution, calibrates PO_2 during each mandatory calibration and subsequently approximately once every 24 hours during one of the ongoing PCO_2 calibrations.

To achieve local arterialization of the skin tissue at the measurement site, Sentec TC Sensors are operated at a constant recommended sensor temperature of 41 °C in neonatal and 42 °C in adult/pediatric patients if PO_2 is disabled and 43 °C in neonatal and 44 °C in adult/ pediatric patients if PO_2 is enabled. Controls of sensor temperature and application duration are designed to meet all applicable standards. To guarantee safe operation, Sentec TC Sensors reliably supervise the sensor temperature with two independent circuits. Additionally, the tCOM+ software redundantly controls the temperature of the connected sensor.

- **WARNING:** Do not alter or modify the sensor. Use only equipment, accessories, disposables, or parts supplied or recommended by Sentec AG. Use of other parts may result in injury, inaccurate measurements and/or damage to the device.

2 Setting up the Sentec Digital Monitoring System

To ensure proper operation of the system, precisely follow the instructions provided in this Instruction Manual step by step.

- **WARNING:** The instructions given in the Quick Reference Guide and the Instruction Manual for the tCOM+ must be followed to ensure proper instrument performance and to avoid electrical hazards.

Note: Statements in this manual are only applicable for tCOM+ with the software version indicated on the cover page.
Note: SDMS related tutorials, the Quick Reference Guide, the SDMS Instruction Manual and various other manuals are available for online viewing on www.sentec.com/ifu.

- **WARNING:** To ensure patient safety, do not place the monitor in any position that might cause it to fall on the patient.

- **WARNING:** Do not lift the monitor by the sensor cable or the AC power cord because they could disconnect from the monitor causing the monitor to fall on the patient.
- **WARNING:** Chemicals from a broken LCD display panel are toxic when ingested. Use caution when handling a monitor with a broken display panel. Electronic components may content toxic chemicals. Do not ingest chemicals from a broken electronic component.
- **WARNING:** During normal operation, it is recommended that the monitor is always connected to the AC power outlet.
- **WARNING:** Do not connect the monitor to an electrical outlet controlled by a wall switch, because the monitor may be accidentally turned off once the battery is depleted.
- **WARNING:** The use of accessories, sensors, and cables other than those specified by Sentec, may result in increased emission and/or decreased immunity and inaccurate readings of the monitor.
- **CAUTION:** Bleach can corrode metal. Therefore, use bleach cleaners on outer surface only and do not bring in contact with metallic parts. Always perform a final wipe using 70% Isopropanol.

2.1 Connect tCOM+ to AC Power

Plug the power supply DC connector into the DC Power Connector on the rear of the monitor (11) and fix it with the attached nut. Plug the power supply AC connector into the AC power outlet.

- **CAUTION:** When installing/setting up the monitor, ensure that the monitor can easily be disconnected from the AC power source at any given time.

Note: The AC inlet of the power supply may be exchanged by the correct country-specific adapter (US, UK, AUS, EU) or the country-specific mains cable.
Note: The external power supply of the tCOM+ will automatically adapt to the applicable local voltage: 100 - 240V~ (50/60Hz).
Verify that the connection has been established properly by checking the indication (charging or fully charged) of the battery symbol on the display.
If there is no connection, check the power supply, the power supply adapter, the DC connector and the AC connector.

- **WARNING:** Explosion and flammability hazards. Do not use the monitor in the presence of flammable anesthetics / gases or other flammable substances in any environment which has increased oxygen content.
- **WARNING:** Do not spray, pour, or spill any liquid on the tCOM+, its accessories, connectors, switches, or openings in the chassis. If the tCOM+ has been wetted accidentally, it must be removed from AC power, wiped dry externally, allowed to dry thoroughly, and inspected by qualified service personnel before further use.
- **WARNING:** Use only power unit provided by Sentec.
- **WARNING:** To avoid electrical shock, this equipment must be connected to a supply main with protective earth. Ensure that power and protective ground lines are connected correctly. If in doubt (e.g., as this may be the case during home use of the

tCOM+) disconnect the tCOM+ from the outlet and use battery power during patient monitoring.

- **WARNING:** For US, respectively Japan: Grounding reliability can only be achieved when the tCOM+ is connected to an equivalent receptacle marked HG (Hospital Grade), respectively HGJ (Hospital Grade Japan).
- **CAUTION:** If the monitor is operated on an AC power source with a depleted battery and the AC power is subsequently lost, the monitor will shut down immediately and give an audible beep.
- **WARNING:** Use the device only at an altitude of -400 m – 5000 m (and typical corresponding atmospheric pressures). Otherwise, incorrect measurements can result.

2.2 Battery Operation of the tCOM+

The tCOM+ is equipped with a rechargeable internal Li-Ion battery that can be used to power the monitor during transport or when AC power is not available. The Status Icon 'Battery' (see 13.6) indicates the remaining battery charge (%).

Good to know!
When using the tCOM+, a new, fully charged battery will provide up to 4 hours of monitoring time if the display is permanently on, and up to 7 hours of monitoring time if the display is turned off in sleep mode. It takes approximately 4 hours to fully charge a drained battery.

When tCOM+ is switched on, the status of the battery and of the power connection is displayed in the 'Battery' icon (see Appendix 13.6).

The service life of the battery highly depends on the usage of the battery, the number of recharge cycles and the needs of the specific use. A typical service life of 2-4 years can be expected.

2.3 Turning on the tCOM+

Turn on the tCOM+ by pushing the ON/OFF button on the left side panel (6). The tCOM+ will automatically perform a 'Power On Self Test' (POST) and show the booting progress. Check the date/time settings of the tCOM+ and adjust, if necessary, by tapping on the time in the Status Bar (note this adjustment requires a password). Please observe the tCOM+ startup behavior including warnings/cautions as described in the following passage.

Startup behavior

1. After power on the tCOM+ activates the LED bar and indicates the startup process by a sequential light.
2. A few seconds later, the display is activated and shows the startup process including the result of the POST.

- **WARNING:** Do not use the monitor if the LED bar or the display of the monitor was not activated. Instead, contact Sentec authorized service personnel or your local Sentec representative.

3. During the POST the tCOM+ activates the buzzer (one short beep) and the speaker (three short tones).

- **WARNING:** The auditory POST signal functions as an auditory confirmation that the monitor's speaker is performing properly. Do not use the monitor if the speaker does not function, as in this case auditory alarm signals cannot be heard. Instead, contact qualified service personnel or your local Sentec representative.

4. At the end of the POST sequence the result (succeeded of failed) is displayed on the screen. If passed, the monitor will switch to the Measurement Screen or Calibration Screen within 1-2 seconds.

- **WARNING:** Do not use the monitor if an internal problem was detected during the POST (display of the message 'failed' with corresponding error code on POST screen). Instead, contact Sentec authorized service personnel or your local Sentec representative.

- **CAUTION:** Ensure that the fan of the monitor is clear of any obstructions and that the monitor is located in a well-ventilated dust-free environment. Failure to do so could cause damage or malfunction of the monitor.

The startup procedure of the monitor takes approximately 60 seconds.

2.4 Installation of the Calibration Gas Bottle

The Status Icon 'Gas' on the top right of the screen (Status Bar) indicates the current gas bottle content.

The gas bottle slot is located on the left side of the tCOM+ (4). Remove the old gas bottle by turning it counterclockwise.

Remove the cap from the new gas bottle. Insert the gas bottle in the slot, turn it clockwise and thoroughly tighten it (without applying undue force). After a few seconds, the Status Icon 'Gas' indicates that the gas bottle is properly inserted.